

NEW SIPHONAPTERA FROM PERU.

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(13 text-figures.)

MR. C. H. TOWNSEND, the State Entomologist in Peru, has sent us a small collection of Ectoparasites obtained from mammals in the Andes of Peru. The Siphonaptera of this consignment are most interesting. Of the ten species no less than seven are new, one of them representing an entirely new type connecting the genus *Stephanocircus* and allies with the *Leptopsylla* group.

In the Andesian States north of Chile very few fleas have as yet been collected. The present collection goes far to prove that the Siphonapterous fauna of the tropical Andes is a very rich one. We congratulate Mr. Townsend on his success, and thank him for his splendid contribution towards our knowledge of the South American Siphonaptera.

1. *Parapsyllus claviger* spec. nov. (text-figs. 1, 2).

♂ ♀. Nearest to *P. simonsi* Roths. (1904), but abundantly distinct in the modified abdominal segments. The species agrees with *P. simonsi* in the labial

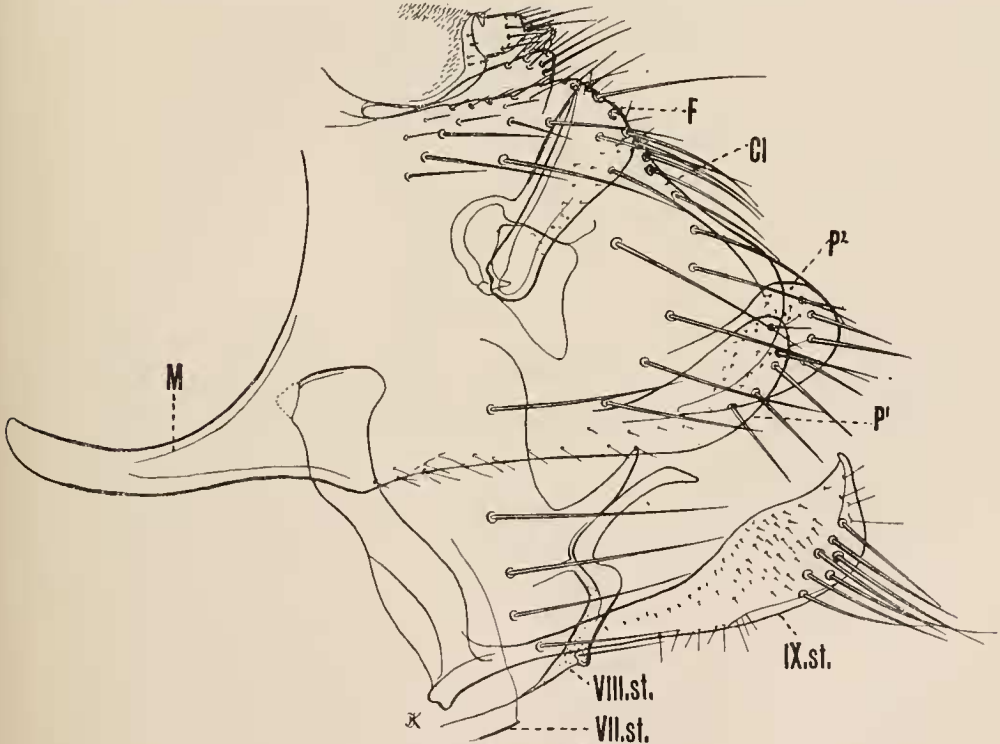


FIG. 1.—*Parapsyllus claviger*.

palpus consisting of five segments, in the abdomen bearing no apical spines on any of the segments, and in the clasper of the ♂ having a non-movable ventral process. The tarsal and tibial bristles are somewhat shorter than in *P. simonsi*, at least in the ♂. We have only one badly preserved ♀ of *P. simonsi*, and therefore are not sure whether there are other differences in this sex besides those mentioned below.

♂. The eighth abdominal sternite bears a vertical row of four bristles on each side and two long narrow processes of a peculiar shape (VIII. st.). The clasper (Cl) is very large, angulate dorsally, and rounded apically. It bears about twenty long bristles and a dozen small ones situated at the proximal portion of the dorsal edge. From the ventral side of the clasper a large process (P¹) branches off, shaped somewhat like a hockey-stick, being curved upwards at the end. The apex of this process bears four or five spine-like bristles and a number of small hairs, there being also minute hairs at the ventral margin of the clasper proximally to the process. The process (P²) of the right clasper is much broader than that of the left side of the body (P¹), this being the first case of conspicuous asymmetry of this kind with

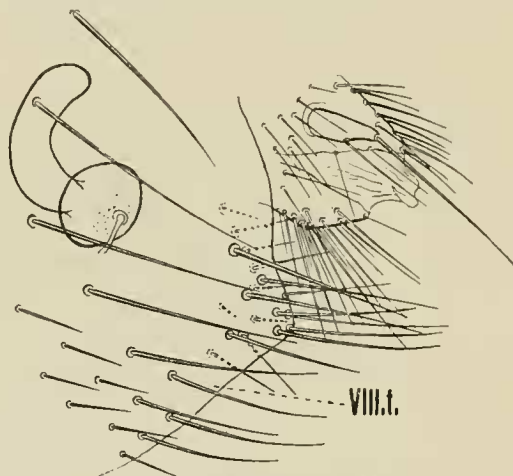


FIG. 2.—*Parapsyllus claviger*.

which we have met among Siphonaptera. The processes and their spiniform bristles, moreover, are individually somewhat variable. The movable exopodite F is inserted nearly in the centre of the inner surface of the clasper, and has the shape of a sock with a very short foot, the tip pointing frontad. The inner and outer arms of the ninth sternite are at right angles to each other (text-fig. 1, IX. st.). The outer arm widens distally, its ventral edge being distally strongly rounded and the upper angle pointed. The widened portion bears on the outer surface about seven long bristles and a large cluster of numerous small ones, minute hairs being placed further proximad and the ventral edge also bearing a row of hairs as shown in the figure.—♀. The seventh sternite bears a row of four or five bristles, and proximally to this row four to six somewhat smaller bristles. The eighth tergite bears more than thirty bristles from the ventral margin upwards on the outer surface, the bristles being more numerous than in the ♀ of *P. simonsi*. The lateral bristle of the stylet is placed at the middle in some specimens, and at three-fourths in others; the apical portion is about half as thick as the proximal portion. The head of the receptaculum seminis is small and rounded, and the tail long.

A short series from near Oroya, Pern, above 12,000 ft., June 4, 1913, off Vizcacha.

2. *Parapsyllus sentus* spec. nov. (text-fig. 3).

♂. A single specimen found on the same host as *P. claviger* differs so considerably in the modified abdominal segments that we consider it to represent a distinct species. The "finger" F (fig. 3) is narrower than in *P. claviger*. This exopodite is so concealed by the eighth tergite that the exact outline of the apical portion cannot be made out very clearly, and therefore is only indicated by dots in our figure. The two processes of the clasper are shorter than in *P. claviger*. The left process is somewhat boot-shaped, with the toes turned upwards. It bears four stout bristles, which are shorter and thicker than in *P. claviger*. The right process

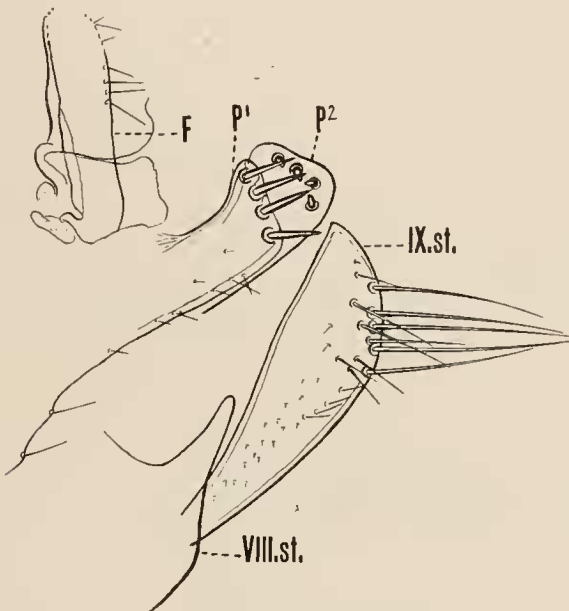


FIG. 3.—*Parapsyllus sentus*.

is truncate, with the angles completely rounded. It also bears four stout bristles, which are placed erect on the plane of the process and therefore are foreshortened in a lateral view of the specimen (as in our figure). The horizontal arm of the ninth sternite (IX. st.) is evenly rounded ventrally, almost straight dorsally, and has only a small number of minute hairs. The number of bristles on this sternite is not the same on the right and left sides of the specimen. The eighth sternite (VIII. st.) has only one process instead of the two of *P. claviger*.

One ♂ from near Oroya, above 12,000 ft., June 4, 1913, off Vizcacha.

3. *Parapsyllus xenurus* spec. nov. (text-figs. 4, 5).

♂ ♀. This species agrees with *P. coxalis* Roths. (1909) in bearing on the fore-coxa a transverse antemedian row of bristles which are thicker and longer than the other coxal bristles. None of the other known *Parapsylli* exhibit this

characteristic. *P. xenurus*, however, is otherwise very distinct from *P. coxalis*, notably in the head.

Head.—The head is much shorter in the ♂ than in that sex of *P. coxalis*, and

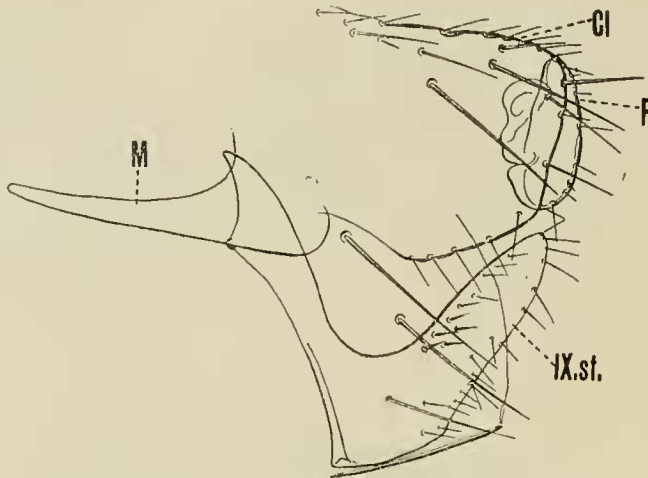


FIG. 4.—*Parapsyllus xenurus*.

bears in front of the eye a row of five bristles in the ♂ and of three in the ♀, besides some small hairs. The genal process is not sinuate at the apex, as is the case in *P. coxalis*, and has behind the eye one or two long bristles and two short ones.

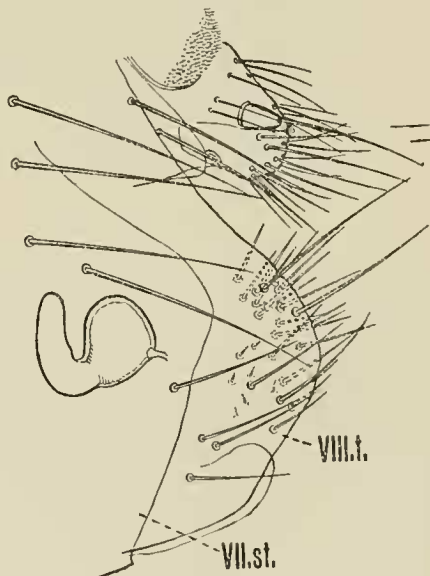


FIG. 5.—*Parapsyllus xenurus*.

There are no bristles along the ventral genal edge, as for instance in *P. cocyti* Roths. (1904). The occiput has on each side a subapical row of five bristles, and above the antennal groove one (♀) or two (♂) long bristles. The bristles of the

first antennal segment, which are very long in the ♀ of *P. coxalis*, are scarcely so long as that segment in the ♀ of *P. xenurus*. The labial palpus consists of five segments, and reaches to three-fourths of the coxa.

Thorax.—The mesonotum has only a few bristle-like teeth on the inner surface near the apical margin.

Abdomen.—The first tergite bears some apical spines.

Legs.—The legs agree best with those of *P. coxalis*, but the fourth segment is rather longer in the mid- and hindtarsi, and the bristles of the hindtibia and hindtarsus are shorter.

Modified Segments.—♂. The eighth sternite has three or four bristles, which are much shorter than in *P. coxalis*. The clasper (text-fig. 4, Cl.) is oblong, with the ventral margin and apex rounded and the dorsal margin very slightly concave. There are four or five fairly long bristles on the outer surface of the clasper and numerous smaller ones at the edges, as shown in the figure, a long one being placed at the apex. The movable exopodite F is straight on the proximal side and rounded on the opposite side, resembling in a lateral aspect an egg with one side straight. The manubrium (M) of the clasper is very slender. The inner arm of the ninth sternite is much narrower than the outer arm. The latter is proximally very broad and tapers slightly from before the middle to the apex. It bears a row of thin bristles along both the ventral and dorsal margins (text-fig. 4, IX. st.), the proximal bristles of the dorsal row being rather thicker than the others.—♀. The eighth tergite is very thickly studded with bristles on the inner surface at the apex, bearing on the outer surface about a dozen bristles or less (text-fig. 5, VIII. t.). The head of the receptaculum seminis has the shape of a fig, and is shorter than the tail, being quite different from that of *P. coxalis*.

A small series from Ninahuanchi, Pern, 13,000 ft., March 1911, off Vizcacha.

Neotyphloceras gen. nov.

Although agreeing with the Palaearctic genus *Typhloceras* Wagn. (1903) in the possession of an eye and a genal comb, the species of *Neotyphloceras* are not very nearly related to *T. poppei* Wagn. (1903) and *favosus* Jord. and Roths. (1914), the only species as yet known of that genus.

Neotyphloceras is characterised as follows :

Eye without pigment. A genal comb of four spines from the genal edge across the gena to the eye, the first spine being almost completely covered by the second ; no spine behind the eye (text-fig. 6). Genal process narrow, about as long as the longest genal spine. Frons with two rows of bristles. Second segment of maxillary palpus as long as fourth. Labial palpus consisting of five segments. No circular internal incassation in the anteaunal groove.

Pronotum with one row of bristles, the spines of the comb as long as the pronotum. Abdomen without lateral spines, with or without one or two dorsal spines on the proximal segments. Seventh tergite with two antepygial bristles on each side in both sexes. Pygidium strongly convex posteriorly.

Fifth tarsal segment with four lateral pairs and one ventral proximal pair of bristles.

In the ♂ the eighth abdominal segment ventrally with few bristles. Claspings organs with two manubria on each side. In the ♀ one receptaculum seminis, which has a very large head and a short tail (text-fig. 8).

Genotype: *rosenbergi* Roths. (1897, as *Typhloceras*):

Besides the type, we have another species, which we describe below. Both these species differ from *Typhloceras poppei* in some additional details not mentioned in the generic diagnosis. For instance, the bristles on the thorax and abdomen are much less numerous; the hindcoxa bears only a few bristles on the inside; there are no small bristles in front of the row on the abdominal sternites; the thorax, abdomen and tibiae are not reticulated; the tibiae have more dorsal bristles than in *T. poppei*; the fourth hindtarsal segment is much shorter; etc.

4. *Neotyphloceras crassispina* spec. nov. (text-figs. 6, 7, 8).

♂ ♀. All the specimens of *Neotyphloceras* which we have from Ecuador belong to *N. rosenbergi* Roths. (1897), while the examples from Peru, Bolivia and Chile contained in our collection belong to a different species, which we propose to call

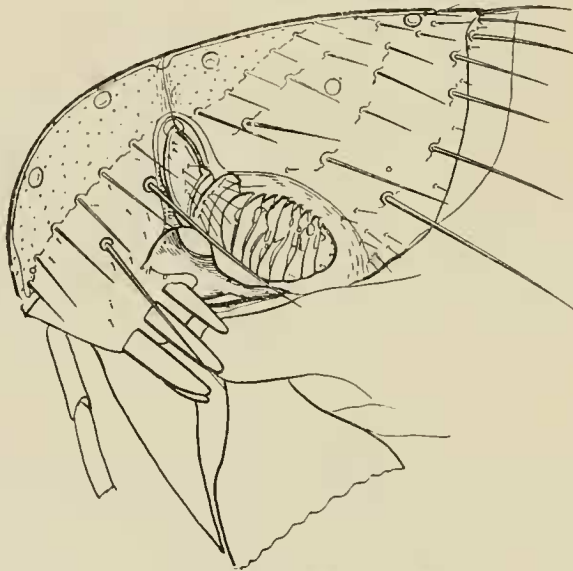


FIG. 6.—*Neotyphloceras crassispina*.

crassispina on account of the very strong spines present in the ♂ at the apex of the exopodite of the clasper and at the apex of the ninth sternite. The differences between *rosenbergi* and *crassispina* are so important that we cannot have any doubt about the specific distinctness of the two insects, although the species appear to represent each other geographically.

The frons is strongly rounded (text-fig. 6, ♀); it does not bear a tubercle, nor is it strongly incrassate from the oral corner upwards as in *N. rosenbergi*. The anterior row of bristles of the frons contains six bristles. The bristles on the occiput are arranged in four rows, as in *rosenbergi*, but are not so numerous as in that species. The genal spines as well as the genal process are more pointed than in *rosenbergi*.

The abdominal tergites have no apical spines in *crassispina*, while in *rosenbergi* the second and third tergites bear one, rarely two, dorsal spines on each side.

The hindfemur has a row of five to seven bristles on the inner surface. The hindtibia bears five or six bristles on the inner surface, thirteen to sixteen lateral

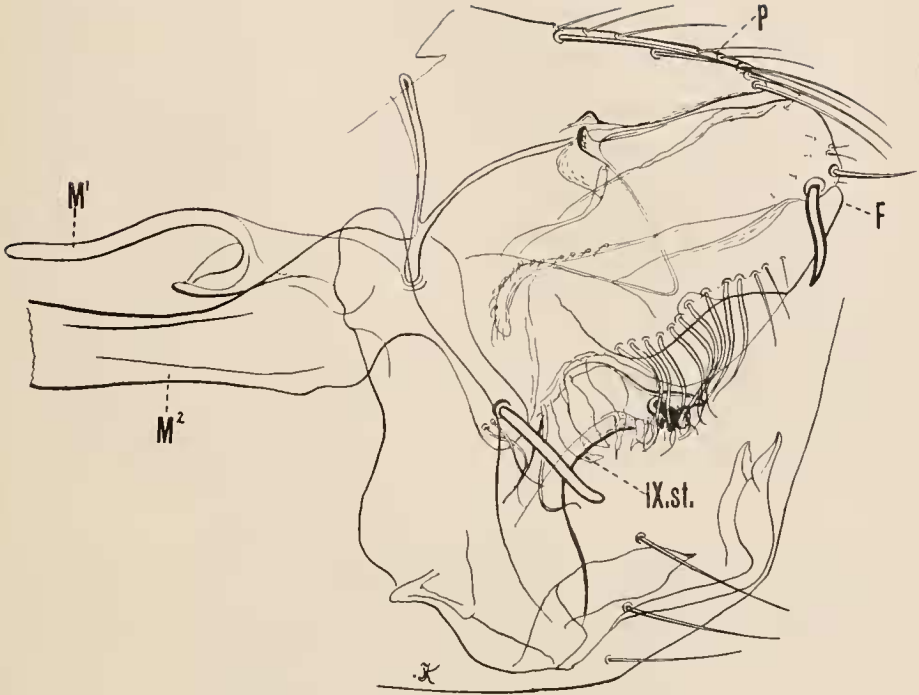


FIG. 7.—*Neotyphloceras crassispina*.

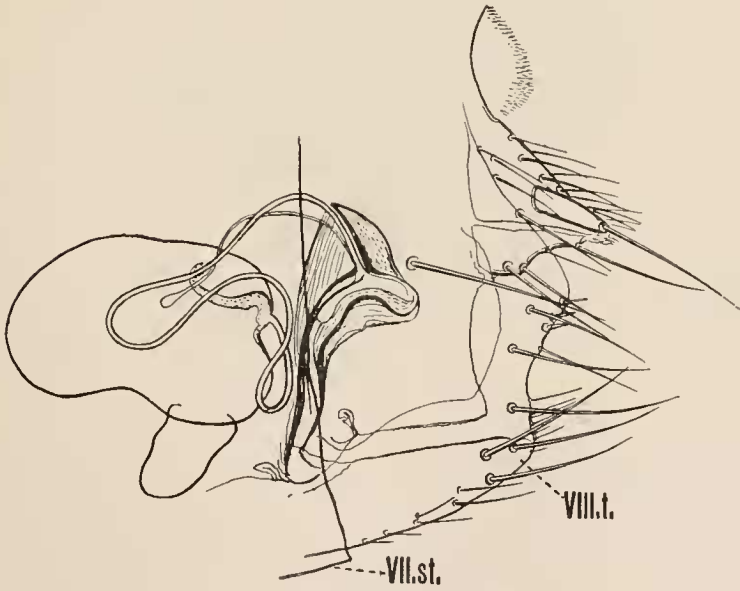


FIG. 8.—*Neotyphloceras crassispina*.

ones on the outer side, exclusive of the apical ones, and eight or nine dorsal pairs of bristles, besides one or two single dorsal bristles.

Modified Segments.—♂. The eighth tergite has four or five bristles above the stigma. The process P (text-fig. 7) of the clasper is longer than in *rosenbergi* and bears ten to twelve bristles. The small manubrium M¹ has proximally a projection which is triangular in a lateral view. The movable process F is similar to that of *rosenbergi*, but shorter. It bears a very strong, black, curved, subapical spine, above which there is a smaller bristle and a thin hair, and at the ventral margin a regular row of twelve to fourteen bristles. These latter bristles are pale as in *rosenbergi*, proximally rather stout and distally thin. The ninth sternite (text-fig. 7, IX. st.) has at the apex of the distal arm a large, short, obtuse spine, as shown in the figure. This distal arm of the ninth sternite is much more curved than in *rosenbergi*. Proximally to the "finger" the clasper bears at the ventral margin a number of broad, long membraneous flaps, which are presumably modified bristles.—♀. The seventh abdominal sternite (text-fig. 8, VII. st.) is less rounded than in *rosenbergi*.

A small series from Pachacayo, 12,000 ft., March 27, 1913, off a rat.

Also from Bolivia and Chile.

Cleopsylla gen. nov.

We base this genus on a most interesting species, which connects *Leptopsylla* and allied genera with *Craneopsylla* and *Stephanocircus*.

Head (text-fig. 9) divided by the antennal groove as in the genera mentioned.

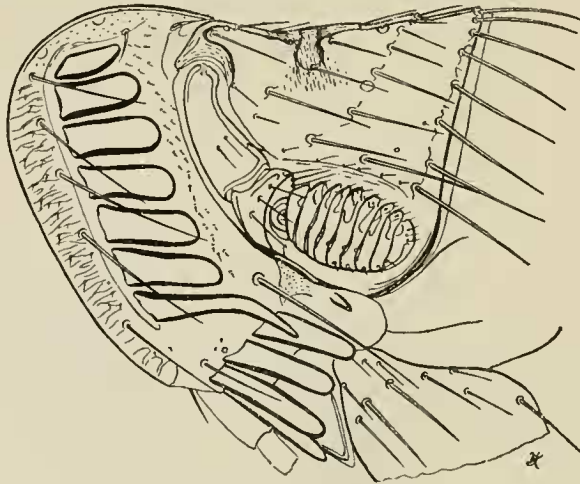


FIG. 9.—*Cleopsylla townsendi* ♂.

Frons strongly reclining backwards; a comb at the posterior edge of the gena, and, separated from this comb, another comb of large spines parallel with the frontal margin, these spines inserted at about one-third the way from that margin to the antennal groove. In front of the frontal comb a row of long bristles. The portion of the frons which bears this comb not divided off by a suture from the genal portion as in *Craneopsylla* and *Stephanocircus*. Mouth-parts short; apex of maxilla not sharply pointed; labial palpus consisting of four segments. Occiput with internal

dorsal incassation before the centre. Bristles on second segment of antenna short. Bristles of body and legs numerous. Two antepygial bristles in both sexes on each side. Fifth tarsal segment with four pairs of lateral bristles, and in the fore- and midtarsi with an additional ventral pair proximally. One receptaculum seminis. Genotype: *C. townsendi* spec. nov.

This is the nearest approach to the *Stephanocircus* group of genera which has as yet been discovered. The homology of the combs is at once apparent if we compare fig. 9 with fig. 13. The two long genal bristles present in *Craneopsylla* (the South American genus representing in that continent the Australian genus *Stephanocircus*) are also found in *Cleopsylla*. The chaetosity of the body is similar in the two genera, but *Craneopsylla* has lost the long bristles placed in front of the frontal comb in *Cleopsylla*, with the sole exception of the most ventral bristle, which is

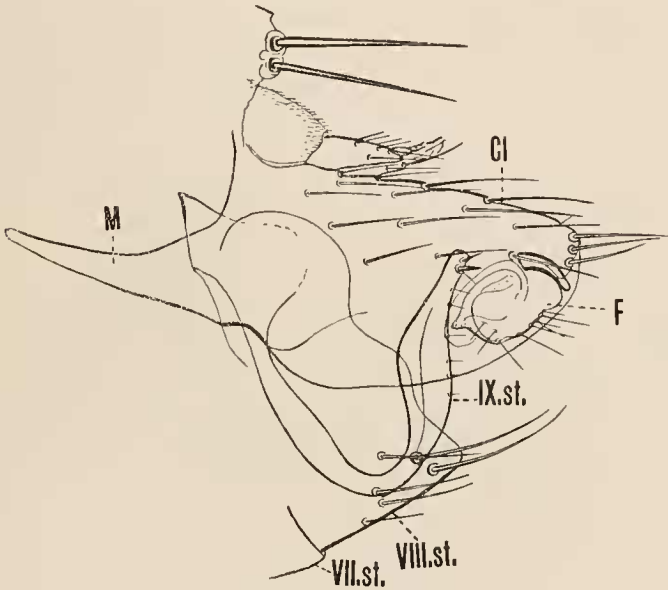


FIG. 10.—*Cleopsylla townsendi*.

present in *Craneopsylla*. The frontal portion of the head of *Cleopsylla* is less modified than in *Craneopsylla*, whereas that new genus is more specialised than *Craneopsylla* in possessing only four segments to the labial palpus and in having lost the proximal pair of plantar bristles on the fifth hindtarsal segment.

5. *Cleopsylla townsendi* spec. nov. (text-figs. 9, 10, 11).

Head.—♂ ♀. The frons (text-fig. 9) has a comb of seven spines, of which the ventral one is long and pointed, and a row of five bristles, there being numerous small hairs in front of and behind the comb. The gena bears a comb of four spines and a small spine on the genal process. The occiput has four rows of bristles. The rostrum reaches to four-fifths the length of the forecoxa.

Thorax.—The prothorax has two rows of bristles, and a comb of twenty-two to twenty-four pointed spines. The meso- and metanota have also two rows of bristles,

with a vestigial third row in front. The metepimeron bears eight or nine bristles (4 or 5, 4).

Abdomen.—Tergites I to V bear on each side one or two short apical dorsal spines; I to VII have two rows of bristles, with a vestigial third row in the ♀; on II to VI two of the bristles of the posterior row are placed below the stigma. Sternites III to VI bear a single row, in the ♂ of about eight on the two sides together, and in the ♀ of about nine or ten, with a few bristles in front of the row on sternites III to IV, which are particularly evident in the ♀. Sternite VII (text-fig. 11, VII. st.) has in the ♀ eighteen bristles on the two sides together, the row being placed near the apical margin.

Legs.—The hindcoxa has a row of spiniform bristles on the inner surface, besides thinner bristles. The hindfemur bears on the outer side three subapical ventral bristles and on the inside one short one. The mid- and hindtibiae have five to seven dorsal notches, and three rows of lateral bristles on the outer surface.

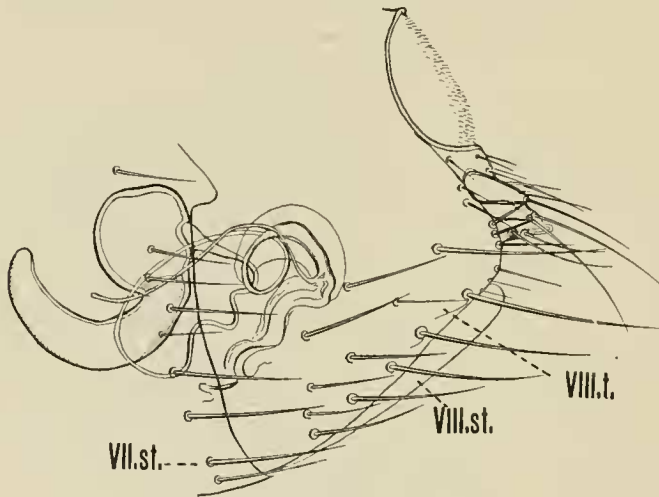


FIG. 11.—*Cleopsylla townsendi*.

The bristles do not form a comb. There are no lateral bristles on the inner side of the tibiae. The forefemur has one lateral bristle on the inside and none on the outside. The bristles of the tarsi are numerous, but short; the longest apical bristle of the first hindtarsal segment does not reach to the apex of the second segment.

Modified Segments.—♂. The eighth sternite is longer than the tergite, and has a row of six bristles, with one or two additional ventral bristles. The clasper (text-fig. 10, Cl) is large, longer than broad, with the upper margin nearly straight, the ventral margin distinctly rounded, and the apex obtuse. It bears about sixteen bristles, of which three are situated at the apical margin. The manubrium (M) is very slender as compared with the clasper. The exopodite F is quite small, placed near the apex of the clasper, and bears some thin hairs at the ventral margin. The inner and outer arms of the ninth sternite somewhat resemble a lyre (IX. st.), being rather strongly rounded at the elbow. There is one rather stout short spine near the tip of the outer arm, a smaller bristle at the tip, and some thin

hairs near these spines as well as farther proximally.—♀. The seventh sternite (text-fig. 11, VII. st.) is truncate-emarginate, and bears a small rounded lobe on a level with the most dorsal bristle of this sternite. The eighth tergite has four or five bristles below the stigma, twelve to fourteen bristles on the ventral portion, and six short ones at the apical margin, the two upper ones of these six being rather stout (text-fig. 11, VIII. t.). The tenth tergite is not separated from the ninth by a suture in either sex. The stylet is about twice as long as it is broad near the base, being bottle-shaped. The receptaculum seminis has a short head and very long tail.

Length (mounted specimens): 1.7—2 mm.

One pair from Pachacayo, Peru, 12,000 ft., March 27, 1913, off a rat.

6. *Craneopsylla inca* spec. nov. (text-fig. 12).

♀. Closely allied to *C. mars* Roths. (1898), from Tierra del Fuego, but differs in the genal comb and the seventh and eighth abdominal segments.

There are only five spines in the genal comb instead of six, a difference which

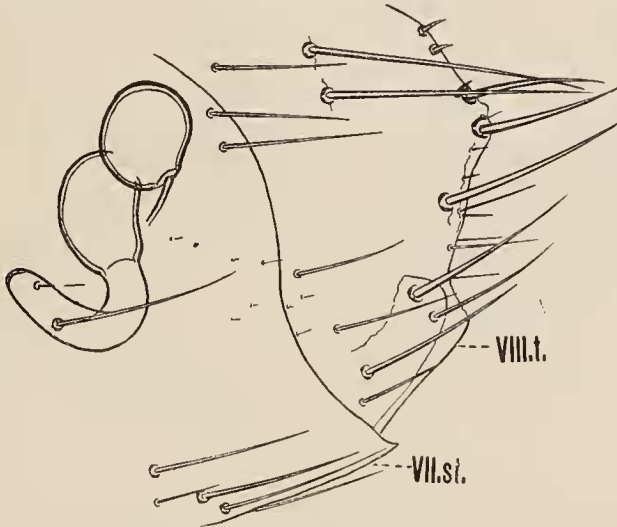


FIG. 12.—*Craneopsylla inca*.

may not be constant. The seventh abdominal sternite (text-fig. 12, VII. st.) has a more convex apical margin, and the row of bristles it bears is widely interrupted. The eighth tergite (VIII. t.) has more bristles than in *C. mars*, there being about twenty bristles on each side of this segment, besides those placed at the apical edge. This edge is somewhat angulate above the centre, and bears at this point two bristles on the outer side, the lower one of them being as thick as, but much shorter than, the long lateral bristles. From the angle upwards there are three short stout bristles on the inner side of the segment. The receptaculum seminis has the same peculiar shape as in *C. mars* and *C. ares* Roths. (1911), the head being divided by a very deep transverse constriction into two portions, of which the terminal one is nearly globular (text-fig. 12).

One ♀ from Pachacayo, Peru, 12,000 ft., March 27, 1913, off a rat.

7. *Craneopsylla pallas* spec. nov. (text-fig. 13).

♀. Allied to *C. wolffsohni* Roths. (1909), but at once distinguished by the helmet.

The longitudinal diameter of the thin frontal portion of the helmet (text-fig. 13) from the comb forward is only very slightly longer than the longest spine of the comb in *C. wolffsohni*, while it is twice as long as that spine in *C. pallas*, the helmet of *pallas* resembling in shape that of *C. mars*. The occiput and gena are longer than in *C. wolffsohni*, and the genal comb contains six spines instead of five.

The pronotum bears a comb of twenty-four or twenty-five spines, and two rows of bristles, besides one or two additional bristles on each side in front of the rows. The metepimerum has seven or eight bristles in two rows (4 or 5, 3). The

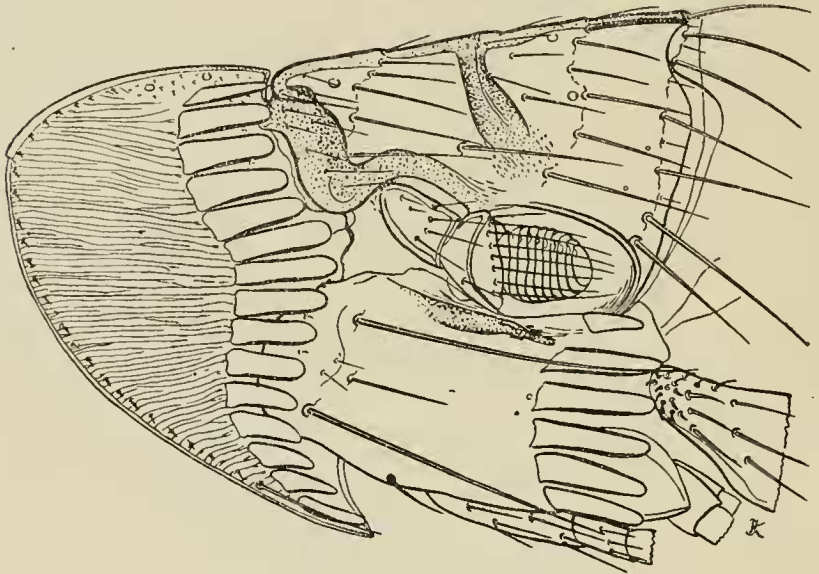


FIG. 13.—*Craneopsylla pallas*.

seventh abdominal sternite bears about eighteen to twenty bristles on each side, two of which are very long. The eighth tergite bears one or two fairly long bristles above the stigma, which is not the case in *C. wolffsohni*, and from thirty to thirty-six from the stigma downwards. The bristles situated at the apex of the eighth tergite are more numerous than in *C. wolffsohni*, and the stylet is slenderer.

2 ♀♀ from Pachacayo, Peru, 12,000 ft., March 27, 1913, off a rat.

This species shares a number of characteristics with *C. wolffsohni* and *achilles* which are not found in the other species of *Craneopsylla*, as tabulated in the following key :

KEY TO THE GENUS *CRANEOPSYLLA*.

A. The two long bristles situated on the gena are both placed near the suture separating the gena from the helmet, the lower bristle being slightly more frontal than the upper one (cf. text-fig. 13). The pygidium is convex behind in the ♀. The tenth tergite is distinctly separated from the ninth, the line of separation being

placed at some distance from the pygidium. The row of bristles at the apex of the hindtibia is interrupted, not forming a regular comb. The head of the receptaculum seminis of the ♀ is of the ordinary sausage shape.

a. Anterior portion of helmet only as wide as the comb.

a¹. Upper spine of genal comb less than half the length of the other genal spines. Only the ♂ known. Ecuador.

C. achilles Roths. (1911).

b¹. Upper spine but slightly, though appreciably shorter, and narrower than the other genal spines. Both sexes known. Chile.

C. wolffsohni Roths. (1909).

b. Anterior portion of helmet twice as wide as the comb. Only the ♀ known. Peru. *C. pallas* sp. nov.

B. The two long genal bristles are both placed on the oesophagus (*i.e.* in the place where the latter shines through) (*wolffhuegeli* and *minerva*) or the upper bristle considerably more forward than the second (*mars*, *ares*, *inca*). There are two or three antepygidial bristles, at least in the ♀. The pygidium is not convex posteriorly (♂ ♀). The tenth tergite is not separated from the ninth by a suture. The head of the receptaculum seminis (♀) is constricted or humped. The row of stout bristles at the apex of the hindtibia is not interrupted.

c. The two genal bristles are placed on the oesophagus shining through. The first segment of the maxillary palpus considerably longer than the fourth. Three antepygidial bristles in the ♀. Receptaculum seminis (♀) with hump.

c¹. Seven genal spines. The longest apical dorsal bristle of the hindtibia reaches (or almost) to the apex of the first tarsal segment, and the corresponding bristle of this segment nearly to the apex of the second segment. Argentina. Both sexes known.

C. wolffhuegeli Roths. (1909).

d¹. Five genal spines. The before-mentioned bristles shorter. Paraguay. ♂ not known. *C. minerva* Roths. (1903).

d. The upper genal bristle much more frontal than the second. The first segment of the maxillary palpus slightly longer than the fourth. The receptaculum seminis (♀) with deeply constricted head.

e¹. Five genal spines. Three rows of bristles on the pronotum. Three antepygidial bristles. Chile. ♂ not known.

C. ares Roths. (1911).

f¹. Six genal spines. Two rows of bristles on the pronotum, third row vestigial. Two antepygidial bristles. Tierra del Fuego. ♂ not known. *C. mars* Roths. (1898).

g¹. Like *mars*, but with five genal spines. Peru. ♂ not known.

C. inca spec. nov.

